



# Farmers' Perception towards Organic Fertilizers in Kutch District of Gujarat, India

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Agriculture is backbone of the Indian economy. In India, about 60 to 70 per cent of the population is employed in agriculture, which generates around 20 per cent of the GDP of the nation. There is a shift observed in fertilizer usage. Different agencies are laying emphasis on the use of organic fertilizer. The study on farmers' perception towards organic fertilizers in Kutch district of Gujarat was carried out. Multi stage sampling was used to select 200 respondents from the Anjar, Bhachau, Bhuj, Mandvi & Nakhrana talukas of Kutch district. The result indicates that majority of farmers were male and they are in the 36 to 50 years age group, about half of the respondents were having family size of 3 to 5 members. About the respondents, 37% of the farmers had primary education, 24% had secondary education, and 17% were illiterate. The main source of income of

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the farmers was agriculture and the income of majority farmer is between 1 lakh to 2.5 lakh. Average land holding size of farmers was less than 5 acres. Irrigated farming was practiced by most of the farmers and tube well found to be the main source of irrigation. Main crop was Pomegranate with 51.00 per cent followed by Castor, Cotton, Vegetable crops and other crops. All the farmers were aware about organic fertilizer and all were using organic fertilizer in their field. Most of the respondents strongly believed that application of organic fertilizer helps in improvement of the microbial activity and water retention capacity of soil. It was found that 163 farmers were using packaged organic fertilizers and all 200 farmers were using gaushala compost/farm yard manure, etc.

*Keywords: Awareness; perception; organic fertilizer; FYM; gaushala compost.*

## 1. INTRODUCTION

India is an agrarian nation where more than 70 per cent of the population relies on agriculture for a living [1]. It is the world's largest producer of spices, pulses, milk, tea, cashew, and jute and ranks second in the production of wheat, rice, fruits and vegetables, sugarcane, cotton, and oilseeds. Agriculture is defined as the backbone of the Indian economy [2]. In India, 20.2 per cent Share of GVA govern by Agriculture and Allied sector to Total Economy [3]. Green revolution was successful in meeting the immense food requirement of the country. The basic principle behind the revolutionary technique was to maximize the output with the application of chemical inputs in the soil. In the effort to maximize the outputs from the farms by the application of synthetic inputs the concern for environment and ecosystem was overlook. During the mid-1900s, countries began to recognize the significant harm that was being done to the ecosystem and public health. As a result, the idea of sustainability began to gain traction in the agricultural sector. A successful sustainable farming technique is organic farming that uses both organic and biofertilizers. The greatest advantage of organic farming is that it can meet the essential plant nutrients without disturbing the soil and ecosystem [4].

Organic farming is an alternative agricultural system that emerged in the early 20<sup>th</sup> century as a response to rapidly evolving farming methods. Numerous organizations dedicated to organic agriculture continue to refine these farming practices today. This approach promotes the use of organic fertilizers such as compost, green manure, and bone meal, and emphasizes techniques like crop rotation and companion planting. The objectives of organic farming include maintaining long-term soil productivity, preventing contamination from agrochemicals,

utilizing local resources, operating within a closed system, and minimizing the use of fossil fuels in agriculture. By adopting a holistic approach, organic farming aims to maximize the productivity and health of various populations within the agro-ecosystem, including soil organisms, plants, livestock, and humans [5]. Generally, there are two common type of fertilizers; organic and inorganic fertilizers. Also, three types of organic fertilizers are there, it includes animal based organic fertilizers, plant based organic fertilizers and mineral based organic fertilizers [6].

The global fertilizer market amounted to more than 193 billion U.S. dollars in 2021, an increase of roughly 12 per cent in comparison with the previous year. Russia has emerged as the world's top global supplier of fertilizers with \$20.65 billion in exports in the first half of the financial year 2022-23. The global market value of organic fertilizers stood at 8.3 billion U.S. dollars in 2020, roughly 3 billion dollars more than in 2015. It is forecast that the value of organic fertilizers worldwide will reach some 15.8 billion U.S. dollars by 2026. World exports most of its organic fertilizer to Vietnam, United States and India [7].

These demographic factors play a crucial role in farmers' purchasing patterns and decision-making processes. Factors such as past experience, low price, credit availability, and brand image of the company rank higher, indicating their influence on decision-making [8]. The most influential factors for organic farmers to adopt organic practices were their interest and belief in the organic concept, farming without chemicals, and support from the government and agencies. They also acknowledged challenges related to weed and pest control, high production costs, labor intensity, market competition, and lower yields compared to conventional farming. [9].

Generally, producer faced various problems like high production costs, irregular raw material supply which directly impact on the cost of raw materials [10].

This research was carried out with the objectives, to study the socio-economic profile of farmers; to study the level of awareness regarding organic fertilizers; to know farmer perception toward organic fertilizers.

## 2. METHODOLOGY

The study on farmers' perception towards organic fertilizers in Kutch district of Gujarat was carried out using the multi stage sampling. Five talukas from Kutch district namely Anjar, Bhachau, Bhuj, Mandvi & Nakhtrana were selected for the study. Four villages were selected randomly from each taluka comprising total of 20 villages for the study. Ten farmers were selected from each village randomly making total 200 respondents. The sampling method for selection of the farmers was non-probability sampling under which the purposive sampling technique was used to find out the farmers doing organic farming. Primary and secondary data were collected to fulfil the objectives of the study.

### 2.1 Analytical Tools

Descriptive statistical tools and techniques like Frequency analysis, Percentage analysis, Graphical representation were used to meet the stipulated objectives of socio-economic profile, market competitor and for the awareness regarding organic fertilizer there were. To study the farmers perception towards organic fertilizers WAM (Weighted average mean) was used.

To calculate the WAM following formula was used.

$$\text{Weighted Average Mean (X)} = \frac{(F1X1 + F2X2 + F3X3 + F4X4 + F5X5)}{Xt}$$

Where,

F = Weight given to each response

X = Number of responses

Xt = Total number of responses

## 3. RESULTS AND DISCUSSION

During the study, following result was founded. All the findings and conclusions are drawn from the questionnaires, which were field out by the respondents in persons.

### Age of the farmers:

Table 1. Age of the farmers

Age	Frequency	Percentage
21-35	22	11.00
36-50	98	49.00
51-65	62	31.00
More than 65	18	9.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

Table 1 provides detailed information on the age wise distribution of different groups in the population. According to the survey, Table 1 indicates that the age range of 36-50 years represents 98 farmers, equivalent to 49.00 per cent of the total. The age range of 51-65 years represents 62 farmers, which was equivalent to 31.00 per cent of the total. The age ranges above 65 years represent 18 farmers, equivalent to 9.00 per cent of the total.

### Gender of the farmers:

Table 2. Gender of the farmers

Gender	Frequency	Percentage
Male	200	100
Female	0	0
<b>Total</b>	<b>100</b>	<b>100.00</b>

Table 2 shows that 200 (100%) farmers were male. There was no female farmer there.

### Family size of the farmers:

Table 3. Family size of the farmers

Family Size	Frequency	Percentage
2 Member	0	0
3-5 Member	128	64.00
Above 5 Members	72	36.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

Family size plays important role in the research. Table 3 highlighted about distribution of family sizes within the given population. It revealed that the majority of families fall within the 3-5 members range (64.00%), followed by families with above 5 members (36.00%). There were no any families with 2-or less than 2 members.

**Education level of the farmers:** Education helps farmers to incorporate the latest scientific advances and technology tools into their daily operations. The Table 4, highlighted a comprehensive overview of the educational

distribution within the studied population, shedding light on the educational composition of the individuals. Table 4 revealed that 17.00 per cent of farmers were illiterate, 74 farmers had studied up to primary level with contributing to 37.00 per cent, up to Secondary there were 48 farmers, which contributing 24.00 per cent, also 15.00 per cent of farmers had education level up to higher secondary and only 7 per cent of farmers were graduate & above.

**Table 4. Education level of the farmers**

Qualification	Frequency	Percentage
Illiterate	34	17.00
Up to Primary	74	37.00
Up to Secondary	48	24.00
Up to Higher Secondary	30	15.00
Graduate & Above	14	7.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

**Annual income of farmers:**

**Table 5. Annual income of farmers**

Income	Frequency	Percentage
< 1 Lakh	66	33.00
1 - 2.5 Lakhs	80	40.00
2.5 - 5 Lakhs	44	22.00
> 5 Lakhs	10	5.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

The Table 5 revealed information about the distributions of income levels within a given population, indicating the frequencies and percentages for different income brackets. It was observed that 33.00 per cent of the respondents had a family income of less than 1 lakh, 40.00 per cent of respondents had 1- 2.5 lakhs, 22.00 per cent of respondents family income had 2.5 to 5 lakhs and only 5.00 per cent respondents family income is more than 5 lakhs.

**Source of income of farmers:**

**Table 6. Source of income of farmers**

Source of Income	Frequency	Percentage
Agriculture	124	62.00
Agriculture + Livestock	46	23.00
Agriculture + Other	30	15.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

Source of the income play important role for the buying of organic fertilizers. There were mainly three sources of income was found. Table 6 revealed that, 62.00 per cent farmers depend

only on Agriculture, around 23.00 per cent farmers were engaged with agriculture and livestock and 15.00 per cent farmers occupation was agriculture and other activity.

**Land holding size of the farmers:**

**Table 7. Size of land holding**

Total Land (Acre)	Frequency	Percentage
Less than 5	74	37.00
5 to 10	64	32.00
11 to 20	36	18.00
More than 20	26	13.00
<b>Total</b>	<b>200</b>	<b>100.00</b>

From the study, it was found that 37.00 per cent of farmers had less than 5 acres of land. Out of the total 200 farmers, 32.00 per cent had 5-10 acre land, 18.00 per cent had 11 to 20 acre of land and 13.00 per cent had above 20 acre of land holding.

**Major grown crops:**

**Table 8. Major grown crops**

Name of Main Crop	Frequency	Percentage
Pomegranate	102	51
Castor	28	14
Cotton	20	10
Vegetable Crop	14	7
Wheat	8	4
Mango	6	3
Mustard	2	1
Date Palm	2	1
Other	18	9
<b>Total</b>	<b>200</b>	<b>100</b>

From the study, it was found that 51.00 per cent of farmers grow pomegranate in their field as main crop. Out of the total 200 farmers, 14.00 per cent grow castor as main crop, 10.00 per cent had cotton, 9.00 per cent had other crops in their field, following Vegetable crop (7.00 per cent), Wheat (4.00 per cent), Mango (3.00 per cent) and Mustard as well as Date palm (1.00 per cent). Result shows that the pomegranate was the main crop in the selected areas.

**Farmers awareness regarding organic fertilizers:** Table 9 shows that farmers awareness regarding organic fertilizers. FYM (Farm Yard Manure) is one of the organic fertilizers and all the farmers aware about FYM, which revealed in the result also.

**Table 9. Farmers awareness regarding organic fertilizer**

Awareness	Frequency	Percentage
Yes	200	100
No	0	0
<b>Total</b>	<b>200</b>	<b>100.00</b>

**Table 10. Awareness towards packaged and non-packaged organic fertilizers**

Awareness	Yes	No
Packaged Organic Fertilizers of Different Companies	163	37
Non-Packaged Organic Fertilizers (Gaushala Compost, FYM, etc.)	200	00

**Farmers agreement towards usage of the organic fertilizers:**

**Table 11. Farmers agreement towards usage of the organic fertilizers**

Rank	Attributes	WAM Score
1	Application of Organic fertilizer will help in improving the microbial activity and water retaining capacity of soil	4.70
2	Application of organic fertilizer will improve the fertility of the soil naturally	4.60
3	Sustainable agriculture is possible by replacing chemical fertilizers with organic fertilizers	4.38
4	Adoption of organic fertilizer can be increased if government support increases	4.13
5	Organic fertilizer like FYM, compost, nonchemical insecticide, pesticides are yearly available in markets	3.95
6	Farmers have sufficient knowledge regarding the application of organic fertilizers	3.72
7	Farmers having confidence regarding the result of organic fertilizer	3.45
8	Organic products can achieve better price in market	2.80
9	Organic fertilizer provides enough produce in quantity	2.41

**Awareness towards packaged and non-packaged organic fertilizers:**

From the result it was found that all farmers aware about the non-packaged organic fertilizers like Gaushala compost, FYM and other, but out of 200 farmers 163 farmers aware about different company’s packaged organic fertilizers.

The level of agreement for the organic fertilizers was formulated by weighted average mean (WAM). The Attributes were given and farmers had to select from Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree [5]. Farmers generally agreed that the application of organic fertilizers helps in improving the microbial activity and water retaining capacity of the soil, as indicated by a WAM score of 4.70, likely because they have observed or have been informed about the long-term benefits of enhanced soil health and structure from organic matter. Similarly, with a WAM score of 4.60, farmers believed that organic fertilizers naturally

improve soil fertility, due to the slow release of nutrients and the enhancement of soil organic content, which promotes sustainable agriculture. However, with a WAM score of 3.45, farmers do not have confidence regarding the results of organic fertilizers; due to inconsistent or slower visible results compared to chemical fertilizers. Moreover, with a WAM score of 2.80, farmers do not believe that organic products can achieve better prices in the market, which was due to lack of established organic markets or consumer demand in their region. Finally, with a WAM score of 2.41, farmers do not think that organic fertilizers provide enough produce in quantity, likely because organic farming often results in lower immediate yields compared to conventional farming methods, causing concern over meeting production targets.

**4. CONCLUSION**

The study on organic fertilizer awareness and farmer perceptions in Gujarat's Kutch district

provided several findings. According to the survey, results show that majority of farmers were male and 36 to 50 years old, with 49.00 per cent. 64.00 per cent of them having 3 to 5 family members. Most farmers source of income is agriculture and the income of majority farmer is between 1 lakh to 2.5 lakh. Also, Average land holding of farmers is between 5 to 10 acre and most type of farming is irrigated also the main source of irrigation is Tubewell. The main crop was Pomegranate with 51.00 per cent followed by Castor, Cotton, Vegetable crop, and other crops. In the survey, it was observed that all farmers were aware about organic fertilizer and all have used organic fertilizer in field. Also, they strongly believed that application of organic fertilizer helps in improvement of the microbial activity and water retention capacity of soil. Out of 200 farmers all were aware about non-packaged organic fertilizer like gaushala compost, FYM and other, but 163 farmers aware about packaged organic fertilizers of different companies. Majority of the farmers used Gaushala compost / FYM and they strongly believe about their result.

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Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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